



U.S. ARMY CHEMICAL  
MATERIALS AGENCY

# FACT SHEET

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## Deseret Chemical Depot

### Mustard Agent Operations Continue

*Workers develop innovative solutions as they face processing challenges*

Mustard agent-filled munitions have been stored at Deseret Chemical Depot (DCD) since 1942. Approximately 46 percent of the total DCD stockpile is mustard agent, with the majority stored in bulk containers. Other mustard-filled munitions in DCD's stockpile include mortars and projectiles.

#### Processing Strategy

Prior to starting the mustard campaign, workers completed initial characterization efforts to meet environmental permit requirements. For bulk containers, characterization results indicated that a portion of the DCD stockpile contained hydrogen pressurization, large heels, and mercury contamination. For mortars, slightly elevated levels of mercury were identified, but the levels were not significant enough to modify the proposed approach to process them.

In order to minimize operational delays in the TOCDF plant, a three-pronged strategy was developed to identify and process bulk containers with low heels and low mercury contamination levels while solutions to the high heel and mercury contamination problems were developed.

The first part of the strategy was a comprehensive sampling of DCD's mustard stockpile. Workers sampled the contents of every mustard agent-filled bulk container—nearly 6,400—and segregated each container based on its mercury content and/or heel size. Sampling operations also allowed workers to safely vent the pressure from those containers with hydrogen pressurization.

Most of the mustard bulk containers were found to have low mercury levels and layers of sludge-like material called heel. The comprehensive sampling project confirmed that approximately

#### WHAT IS MUSTARD AGENT?

Mustard agent is a blister agent, causing chemical burns and blisters on the skin and in the lungs upon exposure or inhalation. In its pure liquid state, mustard agent is colorless. However, when exposed to impurities, it becomes a pale yellow to brown oily substance. Mustard agent freezes at 58 degrees Fahrenheit, boils (becoming a vapor with a garlic-like odor) at 419 degrees Fahrenheit and can remain active in soil for at least three years.



*A TOCDF worker safely reaches inside a glove box to draw a sample of mustard agent from a bulk container. Two storage igloos were modified and equipped with glove boxes to protect the workers as they sampled the mustard agent and measured the heel depth inside each container.*

15 percent of the mustard bulk containers are contaminated with elevated levels of mercury and more than 50 percent have excessive heel.

To overcome these challenges, the Tooele Chemical Agent Disposal Facility (TOCDF) designed and built a heel reduction system and installed a new

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(continued)



*A sample vial containing less than 1 milliliter of mustard agent is prepared for analysis.*

carbon filtration system to safely dispose of those munitions with elevated levels of mercury.

### Disposal Efforts

The TOCDF began its mustard agent destruction campaign on Aug. 18, 2006, processing those bulk containers with little to no heel and little to no mercury. The destruction campaign continued and on November 1, 2007, the TOCDF began destroying more than 54,000 155 millimeter projectiles.

In fall 2008, workers completed installation of the Heel Transfer System (HTS) to effectively deal with those bulk containers with high heel content. The HTS uses a high-pressure, warm-water spray to break up and dissolve a portion of the heel so it can be drained from the original bulk container and transferred to an empty bulk container. This process ensures the heel weighs no more than 630 pounds—the maximum weight allowed by TOCDF's operating permit—before being processed through the metal parts furnace.

In April 2009, workers began a slow, controlled startup of 4.2 inch mortar disposal operations.

During processing, sampling and analysis identified low, but higher than anticipated levels of mercury in the furnace exhaust. TOCDF officials suspect the silver solder used to assemble the weapons is the cause of the higher than expected mercury levels. As a result, mortar operations were halted and TOCDF resumed processing bulk containers with low levels of mercury.

The new carbon filtration system completed full-scale demonstration tests before Utah state regulatory authorities in fall 2009. The carbon filtration system ties into the existing pollution abatement system and uses sulfur-impregnated carbon to capture mercury in the exhaust gases. With the new carbon filtration system up and running, workers began processing mercury contaminated munitions.

DCD's mustard campaign is the largest chemical agent destruction campaign the U.S. Army will undertake in efforts to meet the nation's commitment under the global Chemical Weapons Convention Treaty. Chemical weapons destruction operations at DCD are scheduled to be completed by the treaty deadline of April 29, 2012.